

REMARKS/ARGUMENTS

Applicants acknowledge receipt of the Office Action dated December 9, 2004. Claims 21-86 are pending in the application. By virtue of this response, claims 21, 32, 33, 39, 44, 48, 49, and 63 are amended, and claims 1-20 are cancelled. In addition, new claims 67-86 have been added. Please note that claims 21, 44, 49, and 76 are independent claims. Claims 32, 33, and 49-66 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 44-46 are rejected under 35 U.S.C. § 102 as being anticipated by Griffiths et al., U.S. Patent No. 6,433,234 ("*Griffiths*"). In addition, claims 21-33, 35-43, and 48-66 are rejected under 35 U.S.C. § 103 as being unpatentable over *Griffiths*. Moreover, claim 34 is rejected under 35 U.S.C. § 103 as being rejected over *Griffiths* in view of Griffiths et al., U.S. Patent No. 6,395,944 ("*Griffiths (2)*"). Applicants believe all pending claims are allowable over the art of record and respectfully request reconsideration and allowance of all claims.

I. Claims 32, 33, and 49-66 are not indefinite.

The Examiner has rejected claims 32, 33, and 49-66 under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner states that "[r]egarding claims 32, 33, and 49, the term 'substantially free' makes these claims indefinite since it is unclear how much of oxygen and catalyst material are considered to be 'substantial free'." (Office Action, page 2)

By this response, Applicants have amended claims 32, 33, and 49. Claim 32 has been amended to recite "wherein the first reaction zone effluent comprises less than 100 ppm oxygen." In addition, claim 33 has been amended to recite "wherein the second reaction zone comprises an inorganic oxide." Claim 49 has been amended to recite "wherein the alkene production zone excludes a catalyst."

Claims 32, 33, and 49 therefore satisfy 35 U.S.C. § 112, and Applicants respectfully submit that the Examiner withdraw the § 112 rejections of these claims. Applicants further request that the Examiner also withdraw the § 112 rejections of claims 50-66 dependent from claim 49, since it is submitted that the indefiniteness issue on independent claim 49 has been cured.

II. Claims 44-46 are not anticipated by *Griffiths*.

Applicants respectfully traverse the Examiner's rejections of claims 44-46 under 35 U.S.C. § 102 as being anticipated by *Griffiths*. Applicants submit that the claims are not anticipated by *Griffiths* because *Griffiths* fails to disclose each and every limitation of these claims.

Claim 44 is an independent claim upon which claims 45-46 depend. Claim 44 recites "wherein the heating zone is in thermal contact with the first reaction zone through a dividing element that allows at least a fraction of the heat produced in the first reaction zone to be transferred to the heating zone, and wherein the dividing element does not allow permeation of gaseous components to and from the heating zone and the first reaction zone." Claim 44 further recites "wherein the alkane feed passes through the heating zone and absorbs a sufficient amount of the heat produced in the first reaction zone." *Griffiths* does not disclose wherein the heating zone is in thermal contact with the first reaction zone through a dividing element that allows at least a fraction of the heat produced in the first reaction zone to be transferred to the heating zone, and wherein the dividing element does not allow permeation of gaseous components to and from the heating zone and the first reaction zone. *Griffiths* also does not disclose wherein the alkane feed passes through the heating zone and absorbs a sufficient amount of the heat produced in the first reaction zone. Instead, *Griffiths* teaches direct heat transfer by fluid contact. For

instance, *Griffiths* teaches that "[t]he product stream from step (b) may be pre-mixed with the second feed stream." (*Griffiths*, col. 4, lns. 48-51) *Griffiths* also teaches that "[a]lternatively, the unreacted oxygen and product stream of step c) may be contacted with the second catalyst together with the second feed stream, in the absence of a pre-mixing step." (*Griffiths*, col. 4, lns. 52-55)

In view of the recitations in claim 44, all of which are neither taught nor suggested by *Griffiths*, the Applicants respectfully request that the Examiner withdraw the § 102 rejections and allow claim 44. Applicants further request that the Examiner also withdraw the § 102 rejections of dependent claims 45-46, since it is submitted that independent claim 44 is allowable. Dependent claims 45-46 must *a fortiori* also be allowable, since they carry with them all the limitations of the independent claim to which they ultimately refer.

III. Claims 21-33, 35-43, and 48-66 are patentable over *Griffiths*.

Applicants respectfully traverse the Examiner's rejections of claims 21-33, 35-43, and 48-66 under § 103 as being allegedly unpatentable over *Griffiths*. Applicants submit that, contrary to MPEP section 2143, the Examiner has failed to make a *prima facie* case of obviousness in rejecting such claims in that the Examiner has failed to cite references that teach or suggest all of the elements recited in the rejected claims.

Please note that claim 21 has been amended by this response to recite "feeding the first reaction zone effluent to a second reaction zone." Such an amendment to claim 21 was made to correct an antecedent basis issue and does not add new matter.

Claim 21 is an independent claim upon which claims 22-33 and 35-43 depend, and claim 49 is an independent claim upon which claims 50-66 depend. Claim 21, as amended, recites "feeding the first reaction zone effluent to a second reaction zone" and "introducing an oxygen-

containing feed and an alkane feed to the second reaction zone." *Griffiths* does not teach or suggest feeding a first reaction zone effluent to a second reaction zone and introducing an oxygen-containing feed and an alkane feed to the second reaction zone. Instead, *Griffiths* teaches that the oxygen supply to the second catalytic zone is from the unreacted oxygen of the first catalytic zone. (*Griffiths*, col. 1, lns. 48-63) For instance, *Griffiths* teaches feeding unreacted oxygen and products from a catalytic combustion reaction to a second catalytic zone, along with an alkane feed. (*Griffiths*, col. 1, lns. 48-63 and col. 3, ln. 63-col. 4, ln. 7) In addition, *Griffiths* teaches that the alkane feed "may comprise any suitable hydrocarbon" and may have "[a]dditional feed components such as hydrogen, nitrogen, carbon monoxide, carbon dioxide and steam" (*Griffiths*, col. 4, lns. 56-67) Instead of teaching introducing an oxygen-containing feed to the second catalytic zone in addition to feeding a first reaction zone effluent to the second catalytic zone to provide oxygen, *Griffiths* teaches providing sufficient oxygen to the second catalytic zone by controlling reaction conditions in the first catalytic zone "to ensure that not all of the oxygen is consumed during this process." (*Griffiths*, col. 1, lns. 42-44) For instance, *Griffiths* teaches that "[i]n general, high superficial linear velocities are preferred to ensure that not all of the oxygen in the first feed stream is consumed." (*Griffiths*, col. 4, lns. 33-35) *Griffiths* provides at least two reasons for the desirability of feeding unreacted oxygen to the olefin production zone. Such reasons include retaining some oxygen for the subsequent reaction (*Griffiths*, col. 1 lns. 62-63) and that the thermal energy produced during the contacting step with the first catalyst heats the unreacted oxygen, thereby providing part of the heat necessary for cracking the hydrocarbon feedstock with the second catalyst (*Griffiths*, col. 1 lns. 44-48; col. 2 lns. 59-62).

In addition, claim 49 as amended recites "wherein the alkene production zone excludes a catalyst." *Griffiths* does not teach or suggest wherein the alkene production zone excludes a catalyst. Instead, *Griffiths* teaches a second reaction zone that has a catalyst. (*Griffiths*, col. 2, lns., 9-13) In addition, the Examiner indicates that the "alkene production zone excludes a catalyst" by noting that "Griffiths (1) does not disclose the oxidative cracking step in the absence of a catalyst." (Office Action, page 6)

Claim 49 also recites "providing an alkene production zone comprising a heating zone in thermal contact with the first reaction zone through a dividing element that allows at least a fraction of the heat produced in the first reaction zone to be transferred to the heating zone, and wherein the dividing element does not allow permeation of gaseous components to and from the heating zone and the first reaction zone. . . ." In addition, claim 49 recites "heating the alkane feed through the heating zone of the alkene production zone by heat transfer from the first reaction zone to the heating zone." As noted in Section II above, *Griffiths* does not teach or suggest such recitations.

Accordingly, in view of the fact that the Examiner has not articulated a *prima facie* case of obviousness in respect of claims 21 and 49, Applicants respectfully request that the Examiner withdraw the § 103 rejections and allow claims 21 and 49. Since independent claims 21 and 49 are submitted to be allowable, dependent claims 22-33, 35-43, and 50-66 must *a fortiori* also be allowable, since they carry with them all the limitations of claims 21 and 49.

In addition, the Examiner has rejected dependent claim 48, which is dependent upon dependent claim 47, which itself depends from independent claim 44. Applicants note that claim 47 is listed as rejected in Item 6 of the Office Action Summary. However, claim 47 is not rejected in the Detailed Action. Therefore, Applicants cannot determine the reasons for the

Examiner's rejection of claim 47. Consequently, Applicants assume for purposes of this response that such reasons are included in the Examiner's rejection of claim 48. As noted in Section II above, nothing in *Griffiths* teaches or suggests wherein the heating zone is in thermal contact with the first reaction zone through a dividing element that allows at least a fraction of the heat produced in the first reaction zone to be transferred to the heating zone, and wherein the dividing element does not allow permeation of gaseous components to and from the heating zone and the first reaction zone. In addition, nothing in *Griffiths* teaches or suggests wherein the alkane feed passes through the heating zone and absorbs a sufficient amount of the heat produced in the first reaction zone. Therefore, nothing in *Griffiths* teaches or suggests all of the elements of claim 44, and thus ultimately as recited in dependent claims 47 and 48 since both claims 47 and 48 carry all the limitations of independent claim 44.

IV. Claim 34 is patentable over *Griffiths* and *Griffiths* (2).

Applicants respectfully traverse the Examiner's rejections of claim 34 under 35 U.S.C. § 103 as being allegedly unpatentable over *Griffiths* in view of *Griffiths* (2). Applicants submit that, contrary to MPEP section 2143, the Examiner has failed to make a *prima facie* case of obviousness in rejecting such claims in that the Examiner has failed to cite references that teach or suggest all of the elements recited in the rejected claims.

Claim 34 is dependent upon independent claim 21. As pointed out in Section III above, nothing in *Griffiths* teaches or suggests feeding the first reaction zone effluent to a second reaction zone and introducing an oxygen-containing feed and an alkane feed to the second reaction zone. These missing limitations cannot be supplied by *Griffiths* (2). *Griffiths* (2) teaches an oxidative dehydrogenation reaction to produce syngas from a feedstock comprising a gaseous paraffinic hydrocarbon and an oxygen-containing gas. (*Griffiths* (2), col. 2, lns. 27-36)

Griffiths (2) further teaches that "[i]t is preferred to pre-mix the oxygen-containing gas and the paraffinic hydrocarbons feedstock prior to contact with the catalyst, when present." (*Griffiths (2)*, col. 3, lns. 42-44) Nowhere does *Griffiths (2)* suggest feeding a combustion zone effluent, an oxygen-containing feed, and an alkane feed to the second reaction zone. Therefore, nothing in *Griffiths* in view of *Griffiths (2)* teaches or suggests all of the elements of claim 21, and thus ultimately as recited in claim 34.

V. New Claims 67-86 are allowable.

New claim 67 is a dependent claim from claim 49 and therefore carries all the elements of claim 49. Such new claim 67 is submitted to be allowable because it contains all elements of claim 49 that are not taught, disclosed, or suggested in the prior art.

Similarly, new Claims 68-75 and 86 are dependent claims from claim 44 and therefore each carries all the elements of claim 44. Such new claims 68-75 and 86 are submitted to be allowable because the claims contain all elements of claim 44 that are not taught, disclosed, or suggested in the prior art.

New claim 76 is an independent claim to which claims 77-85 depend. Such new claims 76-85 are submitted to be allowable because the claims contain elements that are not taught, disclosed, or suggested in the prior art.

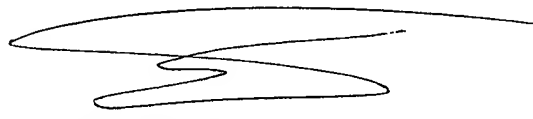
VI. Conclusion

Applicants respectfully request reconsideration, allowance of the pending claims and a timely Notice of Allowance be issued in this case. If the Examiner feels that a telephone conference would expedite the resolution of this case, the Examiner is respectfully requested to contact the undersigned.

In the course of the foregoing discussions, Applicants may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood that there may be other distinctions between the claims and the prior art that have yet to be raised, but which may be raised in the future.

If any fees are inadvertently omitted or if any additional fees are required or have been overpaid, please appropriately charge or credit those fees to Conley Rose, P.C. Deposit Account Number 03-2769.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Tod T. Tumey', is written over a horizontal line.

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